EU CONSUMER ACCEPTANCE SURVEY

2024 European edible insects report by







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BACKGROUND INFORMATION

Scientific base peer-review

Multidisciplinary team

The survey questionnaire was developed by the IPIFF Secretariat together with its members who are part of the Working Group on "Food Safety & Consumer Information," representing diverse scientific and expertise backgrounds (e.g. nutrition, chemical engineering, industrial design engineering with experience in food marketing, health food innovation, biotechnology, psychology, and sociology). It is also worth noting that the majority of the Working Group members also possess experience in conducting similar surveys within the respective markets. Furthermore, work on the report also involved contributions from research institutions representatives and business stakeholders, amongst others. The survey deployment was outsourced to an accredited consultancy with long-standing expertise in similar projects at international level, which was of critical importance in light of the breadth of the current survey. The accredited consultancy was responsible for sampling the participants, related screening, launching the questionnaire, collecting and analysing the data.

External expertise

This IPIFF Working Group also received input from:

Benedikt Jahnke, PhD, researcher from the University of Kessel, Germany. Dr Jahnke is part of the "Holistic evaluation ipiff

of alternative protein sources with special consideration of insects" project.

Riccardo Valesi, PhD, researcher from the Università degli Studi di Bergamo in the fields of Neuromarketing, Social Psychology, and Applied Psychology. He led the study on "Italian consumer acceptance of insect consumption and associated psychological variables" in 2023.

Background literature review

With the objective to provide a framework for the development of the IPIFF EU Consumer Acceptance Survey on Edible Insects, a literature review was conducted prior to the survey to assess the main findings of similar studies, surveys, scientific papers and other related scientific and non-scientific literature on the consumer acceptance of edible insects at global level.¹ This allowed us to:

- Understand the current situation Identify strengths and weaknesses Identify possible opportunities and threats
- Collate available resources
- Better understand consumers' needs and priorities

The literature review identified several key findings:

Strengths

- 1. Premium consumers pay for insects' specific attributes: powdered form, organic origin, and such.
- 2. Certain consumer segments view insects as an exotic and highend food source.
- 3. Consumers value insect products' nutritional value.
- 4. Product information about sustainability factors and benefits.

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Weaknesses & Threats

- Infamiliarity with insect-enriched consumer goods.
- Said products are not part of European culinary traditions. This liminishes the possibility to find traditional recipes with insect ngredients.
- Emotional and affective experiences: disgust/bad taste association.
- Food neophobia and low entomophagy acceptance.
- Fear of eating insects/safety concerns.
- ack of information on market availability.
- Concerns about the price.
- Poor survey results when insects are presented as an alternative to beef.
- 9. Those who never tried insect-enriched products were reluctant to do so.
- 10. Low social and cultural acceptance.
- 11. Divided opinions on products' tastiness.

Opportunities

- 1. Different consumer segments are apparent.
- 2. Different cuisines around Europe present various opportunities.
- 3. Development of more insect product designs.
- 4. The role of emotions and affective factors: overcoming disgust and developing positive associations with edible insects as a marketing approach is more important than taste.
- 5. Improve entomophagy information treatment (e.g. benefits/safety of eating insect-enriched products).
- 6. Suppliers need to better educate target audiences to increase the consumption of food products made with insect ingredients.
- 7. The association of insect products with known product flavours/ food items/dishes is the best way to instigate trials.

¹ The bibliography can be found on the last page of this report.

- 8. Integrate insect-enriched products into conventional types of food.
- 9. Researchers point out the successful marketing strategies used for the wider consumption of sushi or recycled water as good references to be considered by the insect-farming sector.
- 10. Communicate on the nutritional value of insects as food.
- 11. Develop more information materials on the sustainability and environmental aspects to increase positive responses.
- 12. Regular consumption of insect products is determined by previous experience, culinary knowledge, wider cultural adoption, established routines of food provisioning and eating, as well as the availability, price, form, and taste of the products.
- 13. Consumer acceptance can be improved by focusing on different forms of food processing and different insect species.
- 14. The lower the visibility of insects, the higher the consumer acceptance, regardless of insect species.
- 15. Taste, appearance, safety, and product quality were identified as the key factors likely to influence consumers' willingness to try edible insects.

Design & sensory-focused approach

- 1. Design improvements have a high potential to connect several key factors associated with end-consumers, such as socio-cultural environment and product-related circumstances in ways that can make insects less distant from Western consumers' diets.
- 2. Product design can improve adoption by influencing country-specific regulation, impacting the perception of food production, and linking consumers' individual considerations to desired product properties.
- 3. Design interventions in addition to strategies such as marketing, education, and sensory testing can be used as means of bridging the psychological gap between consumers and products.

Consumers' sustainability concerns

1. Consumers primarily see 'sustainable' as a synonym for environmentally friendly, without GMOs and pesticides, and locally sourced, with some specificities across countries.

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- 2. Almost half of the consumers say that sustainability concerns have influence (42.6%) or some influence (16.6%) on their eating habits.
- 3. Price, lack of information, and the challenge to identify sustainable food options, as well as their limited availability, are the main perceived barriers to sustainable food consumption.
- 4. Just over 40% of consumers say they have either stopped eating red meat or have cut it down due to environmental concerns.
- 5. Most consumers (57%) want sustainability information to be mandatory on food labels. However, the idea of taxing less sustainable food is not very popular with consumers (only 1 in 4 agree).

Building a conducive environment

- 1. Much more needs to be done to encourage test and trial, potentially leading to a change in consumer perception. More available information on nutrition and sustainability aspects will support this.
- 2. There is a need to create a conducive environment that allows insect-enriched products to be perceived as accessible, affordable, and socially desirable, while not at the expense of the industry's key message: insect-enriched foods are environmentally sustainable.

Geographic scope—acceptability by country & type of survey/social experiment²

1. The highest positive national responses associated with the willingness to consume food products made with insect ingredients based on their environmental characteristics are found in Spain, Mexico, and Poland.

"Edible Insects Acceptance by Belgian Consumers: Promising Attitude for Entomophagy Development," Caparros Megido, R., Gierts, C., Blecker, C., Brostaux, Y., Haubruge, É., Alabi, T., & Francis, F. (2015) in Journal of Sensory Studies, 30(1), 14–20.

EU-11 national surveys-insects presented as an alternative to meat³

Belgium: consumer acceptance of edible insects after two years of market availabilityquestionnaire⁴

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2. In the same study, the highest scoring countries (scale between 0 and 9) identified besides Spain (+8) and Poland (+7) are Slovenia (6) and Lithuania (6), followed by Portugal (5) and Romania (4).

1. In a study conducted in 11 EU countries, 12.9% of the respondents are unsure if they would replace meat with insects, but did not state they wouldn't.

2. In the same study, Belgian, Austrian, and Dutch consumers are the least averse to eating insects (on average 16.6-16.9% say they would be willing to replace meat with insects).

1. 388 respondents across regions, age, and gender took part n the survey.

Of those surveyed, 79% knew foods with insect-enriched ingredients are commercially available; 11.2% had already eaten foods with processed insects; 31.8% had no experience but were willng to try, and 57% had no experience with or interest in testing such products.

Potential consumers accepted non-displayed processed mealvorms in energy shakes (60.7%), energy bars (59.6%), burgers 59.3%), soups (56.8%), sandwich spreads (56.2%), unfried snacks (56.2%) and fried snacks (52.7%).

Consumers indicated that the presence of insects should be clearly labelled on the package and that they wanted to be able to buy these products primarily from retail supermarkets.

² Results based on the pre-availability of information on sustainability-related aspects.

³ BEUC, the European Consumer Organisation (2020), survey "One bite at the time: Consumers and the transition to sustainable food," retrieved from here.



Consumer acceptance among Dutch & German students⁵

- 1. The Visual Q Test highlighted higher acceptance where survey respondents selected foods they are willing to try that are mostly similar to foods they already knew (biscuits, pasta, hamburgers).
- 2. The survey elaborates on guestions regarding positive consumer attitudes related to information on the health and environmental benefits of consuming food products made with insect ingredients.
- 3. The influence of socio-demographic and psychological factors, as well as available information on the willingness to accept insects as human food and/or animal feed, was analysed.
- 4. Results showed more willingness to accept insects as animal feed than as human food.
- 5. The acceptance among German and Dutch students seems to be driven by issues similar to those in other European countries. These include visual aspects and knowledge about the benefits of said food products.

This concludes that effective efforts to popularise entomophagy could increase the level of familiarity with food products made with insect ingredients, and inform (or educate) consumers about its benefits.

Consumer acceptance among Italian studentsvisual Q test⁶

1. The present paper explores the willingness of Italian consumers to adopt edible insects as food using the Q methodology.

- 2. Two groups-one of 'experts' (e.g. entomologists) and one of 'non-experts,' e.g. students and other researchers, made up the participant sample (P sample).
- 3. Participants were asked to rank-order a set of 36 images of food dishes prepared using insects (Q sample).
- 4. Results showed that visual appearance plays an important role in influencing consumers' acceptance of insect-enriched products as a food source.
- 5. The Q analysis identified three distinct viewpoints or consumer profiles: Factor 1 'The Traditionalist,' Factor 2 'The Fast Food Addicted,' Factor 3 'The Insectivore.'

This study confirms that visible whole insects or insect-enriched products in food may not be appealing to the more conservative consumer, while results for the other two groups identify possible opportunities to better communicate on food products made with insect ingredients.

Germany: experiment based on predisposition of information about insect-enriched foods7

- 1. The objective of the study is to gain insight into German consumers' perceptions of insects as a food source in general and the willingness to try insects as food.
- 2. At the Science Night 2017 at Technische Universität Berlin, a series of interviews coupled with food tastings were conducted.
- 3. If the individual interviewee declined the tasting, a random single piece of information was given and edible insect samples were offered again. It was recorded if a tasting occurred. With 75.2% (n=112), the willingness to taste ranked high. The provision of additional information showed to be an effective means for increasing

6 Mandolesi, S., Naspetti, S., & Zanoli, R. (2021). "Exploring edible insects' acceptance through subjective perceptions: a visual Q study." Journal of Insects as Food and Feed, October 2021.

7 Lensvelt, E. J. S., & Steenbekkers, L. P. A. (2014). "Potential of enhancing consumer acceptance of edible insects via information," in Journal of Insects as Food and Feed, 1(2), 123–132.

8 One Poll survey for Ynsect-Consumer Acceptance of insects in food, conducted in UK, US, France and the Netherlands. Published in April 2022.

the willingness to try insects as food. Almost 20% (9 out of 42) of the interviewees tasted the insect-enriched foods after having been supplied with further science-based information.

4. Additionally, an imagination-behaviour gap was identified.

5. Although 78.5% (n=117) of the interviewees stated that they would consider eating food products made with insect ingredients, 12.0% (14 out of 117) of them were not willing to taste the products they were offered.

6. It is worth noting that more than half of the interviewed vegans and vegetarians tasted the insect-enriched products.

7. Given that information about insects as food is able to stimulate tasting, this creates familiarity with the uncommon food source.

8. More research is required for the development of targeted strategies facilitating the adoption of insect-enriched products in Westerners' diet.

YNSECT's survey: consumer acceptance of edible insects-US-UK-FR-NL⁸

 96% who have tried insects or insect protein said they like it or would try it again.

• Participants would like to see insect protein incorporated more widely into products:

A. US-83% B. FR-80% C. NL-78% D. UK-77%

⁵ Naranjo-Guevara, Natalia; Fanter, Michelle; Maria Conconi, Anna; Floto-Stammen, Sonja (2006) "Consumer acceptance among Dutch and German students of insects in feed and food," in Journal: Food Science & Nutrition, 2020, Nº 1, p. 414–428.

EU CONSUMER ACCEPTANCE SURVEY

The survey was conducted in 6 EU countries: France, Germany, Sweden, Italy, Poland, and Belgium.

The selected countries represent the largest EU markets, being the countries with the largest populations, while at the same time representing different cultural, social, and geographic backgrounds within the EU.

- North (Sweden)
- Centre (Belgium/Germany)
- South (Italy)
- East (Poland)
- West (France)



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Methodology

This quantitative survey was conducted by MIS Group between 15 September to 10 October 2023 in France, Germany, Italy, Belgium, Poland, and Sweden. MIS Group followed a 6-step methodology:

1. Project spec validation:

MIS Group Project Managers confirm the spec (population to be targeted, length, etc.) and provide questionnaire scripting advice (questions order, format, consistency, etc.)

2. Questionnaire programming:

MIS Group developers programme the questionnaire on the company proprietary and secured platform. MIS Group developers are based in Lille (France) and are in close contact with the Project Managers.

3. Tests and validation:

MIS Group Project Managers run both programming tests (i.e. make sure programming is in line with the questionnaire provided by the client and reviewed by the Project Managers) and database tests (i.e. ensure responses are properly recorded on the MIS Group secured server). MIS Group Project Managers provide a test link to the client for them to run tests and validate content before survey administration.

4. Survey administration:

MIS Group Project Managers administrate the survey online (i.e. participants answer on MIS Group or trusted partners websites). MIS Group ensure survey responsiveness on all devices. Before accessing the questionnaire, participants undergo a screening section to ensure they meet the survey criteria (age of 18 and above, for example). MIS Group Project Managers closely monitor the survey's progress and actively send out invitations to achieve the agreed total of completed responses (3000).

5. Data collection:

MIS Group Project Managers collect responses and run strict quality controls (respondent geolocalisation, duplicates, response time, open-ended consistency) before putting the final data together.

6. Results delivery:

MIS Group Project Managers deliver results in Excel format. Results include: coded data, labelled data, basic tabs (overall and per country) and crossed tabs on specific criteria (gender, age, alternative food consumption, insectbased products prior trial, willingness level).

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DEMOGRAPHIC REPRESENTATION

Survey sample

A total of 3,000 respondents from an equally divided sample of 500 participants per country were surveyed for the purposes of this research report.

3. Germany (500)

4. Italy (500)

5. Poland (500)

6. Sweden (500)

Sample by country

- 1. Belgium (500)
- 2. France (500)



Demographic analysis

Gender representation

- The demographic sample represented an equal split between male and female participants in the survey.
- Out of the 3,000 survey respondents, 1437 were men and 1563 were women.

Comparing the gender distribution between countries

- Sweden had the exact same distribution sample of respondents representing males and females.
- All other countries had a slightly larger female representation.
- Belgium was the country that had more female respondents than any other country.
- Sweden had the largest male sample, representing exactly 50% of the respondents.



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Age of the respondents

- The sample reflected very well the distribution of the different age groups.
- The age group between 35 and 44 years old was more represented. Those aged between 18 and 24 years old were slightly less represented.



Age distribution per country

- The least represented age group in all countries was that of 18 and 24-year-olds.
- Germany and Poland had the largest samples of this age group, reaching almost 20% of the respective respondents, followed by Sweden, where it surpassed 15%.

- Said age group was less represented in Italy, barely surpassing 5%, followed by Belgium, reaching slightly more than 10%.
- The best-represented age group across all countries was that of 35–44-yearolds, consistently surpassing 20% of the respondents sample.
- The youngest sample was found in Sweden, with the age groups between 25 and 44 representing almost 55% of the respondents, followed by Poland with 30%.
- The oldest sample was found in Belgium where the age groups between 45 and 99 years old almost represented 50% of the sample, followed by France.
- Sweden represented the largest group of respondents between 25 and 34-year-olds.
- Poland had the largest sample of respondents in the age group 35 and 44-year-olds, followed by Italy.
- Italy was the country where the age group of respondents 45 and 54 were more represented, while the same group was less represented in Poland.
- Belgium and France were the countries where those aged 55–99 were more represented. Sweden and Poland were the countries where this age group was least represented.
- In Sweden and France, those aged 18–24 were second-best represented, reaching or surpassing 15% of all respondents.



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Respondents' education background



- 53% held a high school diploma or had vocational training.
- 42% in total held either a Bachelor's degree, or Master's or Ph.D. degrees
- 5% of respondents had different education backgrounds⁹ not reflected in the above groups.



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Comparing the education level of respondents between different countries

- Ph.D. holders are the least represented group across all countries, with 2% in France, Italy,Poland, Sweden, and Germany, and 1% in Belgium. The Master's degree was the second least represented, with Poland and France taking the lead.
- The majority of the respondents in all countries had a high school diploma, with the largest samples from Poland and Sweden. Germany had the highest number of respondents with a vocational training diploma.
- Bachelor's degree holders were the second most-represented across all countries.
- In France, a larger sample of respondents had university education, with 52% of the respondents having either a Bachelor's or Master's degree, followed by Belgium.
- Sweden and Italy were the countries with the largest samples of respondents holding either a high school diploma or a vocational training diploma.

⁹ Refers to the different types of education titles available at the national context in the different survey countries and not necessarily a lower education level.



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Respondents' income levels

The sample of 3,000 participants represented vastly different income levels. Special attention is paid to the different national levels of income, with a high degree of discrepancy when comparing different countries.

Below you can find the most recently updated information on the average gross salary in each of the surveyed countries (figures exclude holidays and other bonuses):

- The average income in Germany was around €4,100 per month/€49,200 per year (2023).10
- The average income in Sweden was around
- 10 According to *Trading Economics*
- 11 According to *Trading Economics*
- 12 According to *Trading Economics*
- 13 According to *Trading Economics*
- 14 According to *Trading Economics*
- 15 According to Trading Economics

€3,900 per month/€46,800 per year (2023).*11

- The average income in Belgium was around €3,558 per month/€42,696 per year (2023).12
- The average income in France was around €3,321 per month/€39,852 per year (2023).13
- The average income in Italy was around €2,627 per month/€31,524 per year (2023).14
- The average income in Poland was around €1,590
- Above €80,000/year (7%)

Below €20,000/year (21%)

- Between €60,000 and €80,000/year (13%)
- Between €40,000 and €60,000/year (22%)
- Between €20,000 and €40,000/year (36%)
-1076 668 · · · · · · · · 397 ····· 639 220 · · · · .

per month/ €19,080 per year(2023).**15

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* converted from SEK to EUR **converted from PLN to EUR

Participants represented diverse income levels:

- 20% with a very high or medium-high income, from €60,000 and up to more than €80,000 p.a.
- 58% with a medium-level income from €20,000 and up to €60,000 p.a.
- 21% with a lower income, below €20,000 p.a.

Comparing household income levels between different countries

- The highest income levels are found in Sweden, followed by Germany and Belgium.
- The lowest income levels are recorded in France, Italy, and Poland, in this order.
- Above €80,000/year
- Between €60,000 and €80,000/year
- Between €40,000 and €60,000/year





Consumer trends: consumption of alternative types of food products

Out of the total sample of respondents, a significant percentage indicated they already consumed alternative food products, which is relevant information for the insect food market.

- The pre-consumption of alternative food products does not showcase relevant differences if respondents are males or females.
- When comparing between the different age groups, it is evident • that most respondents already consumed alternative food products (consistently above 70%). Those aged 55 to 99 showcased the lowest level of alternative food products consumption (27%), followed by 45-54-year-olds (22%).



No, I don't consume alternative food products



Alternative food products



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Comparing the consumption of alternative food products between different countries

- In the chart below, we can see that alternative dairy products are the most commonly consumed alternative type of food by Europeans. This can be justified by the diverse range of products available across all markets. •
- Alternative protein sources rank as the second most preferred type of food, with some minor variations across countries. •
- Coming in second in France, Italy, and Germany, in Belgium and Poland alternative proteins rank third after dietary supplements. They rank third in terms of preference in Sweden as well, after sports supplements. •
- Dietary and sports supplements rank third, whereas alternative proteins rank second, except in Belgium, where the answer "I do not consume alternative food products" ranks before sports supplements. •
- Out of all listed options, superfoods are the least preferred one in all. •

Type of alternative foods consumed by Europeans by country



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Consumption trends: have you eaten insect food products?

Out of the total EU sample, 33% of the respondents had already eaten whole insects or food products made with insect ingredients.



with insect ingredients (e.g. insect protein)?

Data also indicates that the younger the age group, the more likely they are to have tried insect food products, with the age group 18 to 24-year-olds reaching 46% of respondents who have tried. This is followed by the age group 25–34 year olds, with 39% of respondents confirming they have tried insect food products.

Have you ever tried insect food products: age comparison



Have you eaten food products that contain whole insects or were made with insect ingredients?



Have you ever eaten food products that contained whole insects or were made



Comparing results between different countries

- Germany stood out in terms of the larger sample of respondents who had tried foods made with insect ingredients (whole or as an ingredient), followed by Poland and Sweden.
- Italy and Belgium marked the largest sample of respondents who hadn't tried foods made with insect ingredients. France came in third.

What type of food product made with insect ingredients have you tried?

- 69% had tried insect food products made with insect • ingredients.
- 42% had consumed whole insects (multiple choice). •
- Food made with ingredients from insects (69%)
- Whole insects (42%)



Comparing responses in different countries

- Except for France, all other countries' respondents had tried foods made with insect ingredients rather than whole insects (61%).
- Belgium comes in second with a larger number of respondents who had tried whole insects, even though those who had tried food made with insects represent a smaller sample.
- Italy had a higher number of respondents who had tried food products made with insect ingredients, but it is also the country where • fewer participants had tried whole insects.
- Poland comes in second, after Italy, in terms of both the larger sample of respondents who had tried food products made with insect ingredients, and the smallest sample of those who had tried whole insects.
- Sweden and Germany share the same number of respondents who had tried food products made with insects.

Type of insect-enriched food respondents had tried per country (multiple choice)



What insect species had respondents tried?

Of those who had tried insects, the majority reported they • had consumed grasshoppers (61%) as a whole insect.

- Yellow mealworm (45%) and house crickets (42%) were the second most consumed insect species.
- 21% of the respondents had consumed Lesser mealworm as a whole insect.

Insect species consumed as whole (multiple choice)



Comparing the insect species respondents had tried as whole insects between different countries (multiple choice)

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- Across all countries, the most consumed whole insect was the grasshopper, with the largest samples in France, followed by Belgium and Italy.
- House crickets came in second in most of the countries, with the largest sample in France.
- Sweden makes an exception here, where crickets came in fourth, after yellow mealworm, lesser mealworm, and grasshoppers.
- In Germany, crickets came in third place after yellow mealworm and grasshoppers.
- The largest sample of those who had tried lesser mealworm was found in Italy, while France takes the lead with the yellow mealworm.
- · For more detailed information, please refer to the graph on the right.



Female

Male

Yellow mealworm

Lesser mealworm

Grasshoppers

House cricket

Other

Don't know

6%

3%

3%



51%

38%

Whole insects consumption: gender distribution

- Below, you can find the gender distribution of those respondents who had consumed whole insects. •
- Note the higher percantage of male respondents in most instances. •

What food products with insect ingredients had the respondents consumed before?

- for protein bars, biscuits, or similar.
- almost tied with bread or other baked goods (38%).
- 29% had tried protein shakes made with insect protein powder.



• Most respondents who had consumed food products made with insect ingredients (51%) had opted

• The second most consumed type of products were snacks, crackers or other (41%).

• The third most consumed food product containing insect ingredients was pasta or related (39%),



Comparing different food products consumed across different countries

- Insect-enriched protein bars/biscuits or others were the most popular products in France, Germany, and Poland. •
- Snacks, crackers, and other were the most consumed products in Belgium. The second largest sample of those who had tried snacks was in France, even though it was the fourth most consumed type of product amongst the French overall. Snacks were the second most preferred food for German respondents, with a sample almost the same as that of Sweden.
- Baked goods were the most preferred type of product amongst the Swedish and the Italians. In both countries, pasta or related food products came in second.
- Pasta and bread are tied for the second place in France, and almost came in second in Germany. •

Type of food product by country (multiple choice)





Consumer trends: ranking the taste of food products made with insect ingredients from 0 to 10

• The majority rated the taste as "very good."

56% rated it between 7 and 10.

• The second most popular answer was "good."

• 30% gave it a rating of 5 or 6 out of 10.

1%
2%
4%
7%
13%
17%
22%
20%
6%
8%

Comparing respondents' ranking of different insect-enriched foods across countries

- Belgians rated the • taste better, with 66% giving it a rating between 7 and 10 (out of 10).
- 63% of French and • Swedish rated the taste as very good (between 7 and 10).
- 61% of Germans • rated the taste of food products made with insect ingredients as very good (between 7 and 10).
- 54% of the Pol-• respondents ish answered that the taste was very good (between 7 and 10). This was also the country, tied with Belgium, where the most respondents gave a rating 10 out of 10. Sweden came next.
- In Poland the most • selected answer was 7, while in Italy the most popular rating was 6.



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Respondents' willingness to try for the first time or again food products made with insect ingredients

On a scale from 1 to 10, most of the respondents answered 'yes,' or 'definitely 'yes' as to whether they would try food products made with insect ingredients (73% rating their willingness between 5 and 10).

• 45% said they would definitely try it again, rating their willingness between 7 and 10.

27% rated their willingness to try below 5.

7%
7%
7%
6%
16%
12%
15%
13%
5%
12%

Comparing respondents' willingness to try food products made with insect ingredients between different countries

- Italy stands out as the country where the most respondents replied 10 out of 10.
- **France** is where the willingness • to try said products is overall stronger (8), carrying the largest sample of respondents amongst all countries.
- France was also the second country where 10 was the most common rating.
- Belgium ranks second with • more expressive willingness to try, with the majority of respondents rating their willingness to taste 5 or above.
- The most selected ratings were 5 and 7. The number of Belgians rating 7 is on par with the number of French giving the same rating.
- Germany ranks third in terms • of willingness to try, followed by Sweden.
- All ratings of 5 or above are more expressive in Poland. It is also the fourth country with the largest sample of respondents choosing 10 out of 10.



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Would you try it/try it again?



Willingness to try insect-enriched foods according to age



Willingness to try according to gender



47%

37%

1-to-5

Respondents' reasons for not having tried before or for not consuming food products made with insect ingredients more often

- "unfamiliarity or lack of knowledge."
- 30% answered they did not know where said products are available.
- culture (9%), or other (2%).

Reasons not to try/not try more often (multiple choice)



• The majority of respondents answered "uncertainty concerning their taste or texture," followed by

• The least determinant factors were allergic reactions (22%) or reasons associated with religion or



Reasons for not trying food products made with insect ingredients: comparing answers between different countries (multiple choice)





Factors respondents consider determinant in impacting their consumption of food products made with insect ingredients (multiple choice)

- The most determinant factor is taste, (71%) followed by health benefits (47%), closely followed by price (45%).
- Environmental sustainability-related factors rank signifi-• cantly lower.

Comparing respondents' answers as to the factors they consider determinant in impacting their consumption of food products made with insect ingredients (multiple choice)

- Taste was the most determinant factor in all countries for respondents consuming food products made with insect ingredients. Based • on the previous ranking on the taste of insect food products they had already consumed, we can safely assume they would try it again.
- Price was the second most important factor for respondents in Sweden and Belgium.
- Health benefits came in as the second most critical factor for Italians, Poles, and Germans. The same, albeit to a lesser degree, is valid for the French, there almost tied with price.
- Environment-related reasons came in last, with a special interest demonstrated by the Germans as compared with the rest of the respondents. •









ANALYSING DIFFERENT CONCEPTS

Respondents were asked about their preference between similar products to test different concepts

In this segment of the survey, we tested respondents' attitudes toward specific product concepts:

- 1. Cricket-flour crackers made in the EU versus cricket-flour crackers made in Vietnam.
- 2. A protein bar with the description 'high-protein content' versus the same protein bar with the description 'rich in vitamins (B12, B3, D3), zinc, iron, and healthy fats (omega 3 and 6)."
- 3. A traditional hamburger versus a more sustainable insect-enriched hamburger.
- Oatmeal made with cricket flour, naturally rich in amino acids, versus a traditional oatmeal, with incorpo-4. rated processed amino acids.
- 5. Cricket flour from organically farmed crickets versus conventional cricket flour.
- 6. Conventional pasta vs. protein-rich cricket flour pasta.

Testing concept 1: cricket-flour crackers made in the EU vs. cricket-flour crackers made in Vietnam



Made in the European Union



Respondents were unequivocal: an EU-made product is the most preferred.

- 2647 respondents (88%) selected the product on the left (made in the EU).
- 353 participants (12%) who chose the product made in Vietnam.

The importance of a product's EU origin can be deduced from this test. This reinforces the trustworthiness and reliability of products made in the EU.

Comparing the responses from respondents in each one of the countries, the results are not surprising considering the overwhelming interest in EU-originated food products. Nevertheless, there are certain dissimilarities from country to country:

- made in Vietnam.
- In Germany and Poland, the choice for products made in Vietnam reached 15%.

Number of respondents who prefer "made in the EU" insect products





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Cricket crackers made in the EU vs. cricket crackers made in Vietnam

- Cricket crackers made in the European Union
- Cricket crackers made in Vietnam

Insect bar—rich in vitamins

29%

Insect bar—high protein content



essento

and healthy fats (omega 3 and 6)

.....71%

essento

essento

INSECT BAR

Testing concept 2: protein bar with the description 'high-protein content' versus the same protein bar with the description 'rich in vitamins (B12, B3, D3), zinc, iron, and healthy fats Omega 3 and 6)'



Despite the preference being the same across all countries, there is a slightly higher-on-average preference for the product with the 'high-protein content' description in Sweden (36%), followed by Poland (32%) and Germany (31%) as compared with France (27%), Belgium (25%), Italy (20%).





High protein content

Respondents were also unequivocal, choosing the product with a detailed description of the bar's vitamins and other beneficial nutrients (71%) over the one only reading only 'high in protein' (29%). Therefore, it can be assumed the detailed description of the first option may have had an impact on the results.

Testing concept 2: comparing responses between different countries

Testing concept 3: traditional hamburger vs. more sustainable insect hamburger



Traditional hamburger

Respondents were clear that a more sustainable source of protein would not be reason enough to change their eating habits, with 76% opting for a traditional hamburger versus 24% who chose a more sustainable insect-hamburger.



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Testing concept 3: comparing responses between different countries

The results from the EU sample do not leave much doubt about the results within each target country's collated responses.

Still, it is worth mentioning the higher preference for the more sustainable hamburger made with insect ingredients indicated by German respondents, reaching 31% vs the EU sample average of 24%.



In France, this was the choice of 28% of the survey participants. Sweden, on the other hand, was the country where fewer respondents chose this option (20%). In Belgium, Italy, and Poland, 22% of the respondents preferred a more sustainable insect-enriched hamburger.



Testing concept 4: traditional oatmeal vs. oatmeal made with cricket flour

Testing concept 4: comparing responses between different countries

Traditional oatmeal with incorporated processed amino acids



Oatmeal made with cricket flour, naturally rich in amino acids

Oatmeal made with cricket flour, naturally

Traditional oatmeal with incorporated

rich in amino acids

49%.....

processed amino acids

- •
- Oatmeal made with cricket flour, naturally rich in amino acids



Here, the choice was not as obvious as in the previous product selection questions.

Only a 2% difference between the choice of traditional oatmeal and oatmeal cricket flour.

The fact that the food products made with insect ingredients are naturally rich in amino acids vs. the traditional one seems to have made the choice less easy for the respondents. Insect food products' rich nutritious profile could be interpreted as a driving factor for the increasing consumption of food enriched with insect ingredients.

• Poland was the country where oatmeal made with cricket flour was the less favourable choice (35%).

• In Italy, oatmeal made with cricket flour was the choice of 43% of the participants.

• Oatmeal made with cricket flour was also the choice of 49% of respondents in Belgium and Germany.

Oatmeal made with cricket flour was the preferred choice of the French (63%) and the Swedish (53%).



Traditional oatmeal, with incorporated processed amino acids

Testing concept 5: cricket flour from organically farmed crickets vs. conventional cricket flour



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Testing concept 5: comparing responses between different countries



Testing concept 6: conventional pasta vs. insect-based protein-rich pasta



Conventional pasta

Insect-based protein-rich pasta

Testing concept 6: comparing responses between different countries

- tein-rich pasta made with insect ingredients.
- preference by the respondents.
- 32% of Polish also chose insect-enriched pasta.
- 29% of Belgian respondents chose insect protein-rich pasta.
- The second least favourable rating was found in Sweden (28%).

A third of the respondents chose insect-based pasta vs. traditional pasta



- 32% of the respondents chose insect-enriched protein pasta, while 68% preferred conventional pasta.
- A third of the respondents prefer insect-enriched pasta instead of traditional pasta.

- Insect-based protein-rich pasta
- Conventional pasta



The highest preference for insect-enriched protein pasta was in France with 43% opting for pro-

• Second highest was in Germany, where insect protein-rich pasta tested second best, with 37% of

• The lowest result was in Italy, where only 23% preferred insect-enriched protein pasta.

Survey participants were asked to rank the products below, from most preferred to the least preferred:

Out of 12 products, 5 food products made with insect ingredients are ranked first.

- The most preferred product was the traditional hamburger, being the first choice of 34% of the respondents.
- The second best rated, and the best rated amongst the insect-enriched products, was the cricket crackers made in the European Union (14%).
- Conventional pasta is at 14%.
- Insect-enriched vitamins sports bar, comes in (12%).
- The insect-enriched hamburger ranks fifth (5%).
- Oatmeal made with cricket flour ranked sixth (4%), tied with traditional oatmeal (4%).
- Insect-enriched protein-rich pasta ranks seventh (3%).
- Cricket crackers made in Vietnam rank eighth (2%).
- Cricket flour made from organically farmed crickets comes in at ninth place (2%).
- Conventional cricket flour comes in last with 1%.



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How did you become aware of insect-based food products?

- 1. The majority of the respondents replied that they had become aware of food products made with insect ingredients through friends.
- 2. The second most popular answer was through the media.
- Travelling to a country where food is made with insect ingredients was the third most popular answer. 3.
- 4. A similar share of respondents confirmed they had become aware of insect-enriched products through advertisements.
- 5. Sports nutrition and insect-enriched protein powder came in fifth.
- 6. Restaurants ranked relatively low as regards their role in informing respondents about the availability of food products made with insect ingredients.
- 7. Other sources of information.

Sources of information





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25%

- most overarching determinant.



By a friend

Through an advertisement

Through an article in a newspaper/magazine or seen on TV

By traveling to a country where food made with ingredients from insects are part of their culinary cultural heritage

Because I do sports and have used sports supplements made with insect protein powder (e.g. protein powder, shakes, sports bars)

I visited a restaurant where food made with ingredients from insects was part of the menu

Other

The groups 18–24 and 55+ predominantly became aware about said products through friends

• The age group of 35–44 predominantly became aware through an article/media outlet

• For those aged 45–54, travelling to a country where insect food products are part of the diet is the





The score was as follows (av. ranking):

- The most influential factor was knowing someone who already consumes food products made with insect ingredients.
- The second most influential factor was the trustworthiness of EU-originated insect-enriched food products.
- Being part of the solution to world hunger came in as the third most influential factor.
- The fourth most determinant factor was the availability of traditional food products that already include insect ingredients.
- Being curious about new gastronomic experiences and the insect farming's sustainable protein production practices both came very close at fifth and sixth place respectively.
- The least influential reasons were related with the nutritional benefits associated with eating food products made with insect ingredients, and insects already being consumed in many parts of the world.



Insects are very high in protein and therefore I would consume products enriched with insect protein (e.g. sports bars, protein powder)

Food products made with ingredients from insects are already consumed in many parts of the world

Food products made with ingredients from insects are highly nutritious, with very high protein content and important vitamins, amino acids, healthy fats, iron, and zinc

Insect farming provides a sustainable protein alternative

I am curious about new and exotic gastronomic experiences

You can already find many types of traditional foods which already include ingredients from insects (i.e. pasta, granola, protein bars)

I feel I am making a difference by eating food products made with ingredients from insects as they represent a solution to world hunger and to climate change

If I know the food products made with ingredients from insects are produced in the European Union

My friends and/or relatives are enthusiastic about eating food products made with ingredients from insects

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3.85	
4.08	
4.17	
4.39	
4.89	
5.18	
5.44	
5.94	
7.08	



Influence of statements on willingness to try insect-enriched products per country



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My friends and/or relatives are enthusiastic about eating food products made with ingredients from insects



Insect-enriched sports foods





How often respondents exercise:



The respondents unequivocally replied (71%) they would consider consuming food products enriched with insect protein when aware of their high protein content, such as in the cases of protein bars or protein powder.

Male participants are more willing to try insect sports food.



Purchase intent

How likely are you to buy sports food products made with insect ingredients?



Purchase intent by gender

Men are more likely to buy sports insect-enriched food products than women. Age group 35–44 predominantly gave it a rating of 7, thus showcasing a stronger intent to buy.



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Purchase intent by age group

- Respondents indicated clearly they would be willing to purchase sports food products made with insect ingredients. Within a scoreboard from 0 to 10, 7 was the favourite rating, and 8 was the third most picked one.
- The percentage of respondents who replied 5 or above represented more than half of the replies.
- Men are more willing to buy said products than women.
- The age group between 35 and 44-year-olds have a stronger purchase intent as compared to other age groups.









What factors would make you more likely to consume food products made with ingredients from insects?

- 1. Affordable prices were the most determinant for respondents.
- 2. The second most influential factor was availability in mainstream retailers, showcasing consumers' readiness to buy food products made with insect ingredients if they are available in local stores.
- The third most important factor was related to the lack of knowledge of or information on how to prepare/cook insect food products. 3.
- 4. The fact that familiar brand names could carry food products made with insect ingredients also played a relevant role, closely followed by the notion of more appealing food products that are made with insect ingredients, or the fact that consumers know someone who already consumes them.
- 5. The availability of food products made with insect ingredients on restaurant menus was the least potent determinant of all.

Factors to encourage insect-enriched products consumption (multiple choice)



62%

42%

40%

Factors that influence the potential consumption of insect-enriched products

- When comparing the responses from different countries, affordable prices were the essential determinant in France as compared to other countries.
- The French also showed more concern about the availability of insect food products in main-stream retailers.
- The need for more information on how to cook/prepare them is more important for the Swedish than for respondents from other countries.
- The Swedish were also more concerned than others about having someone they know who already consumes insect food products or about the existence of known retail brands that produce food products made with insect ingredients.



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6%

4%



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7%

6% 6%

Daily

5%

Consumption frequency

How often would you consume insect-based food products if they become widely available?



Frequency according to age

- Respondents replied to be ready to consume food products made with insect ingredients 'Sometimes' and 'Often.'
- 'Never' and 'Daily' are the two least chosen ones.
- Younger generations are more likely to consume food products made with insect ingredients more often, and the older generation are more likely to be reluctant.





46%

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